

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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## PCT

### NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(PCT Rule 71.1)

|   |  |  |
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| Date of mailing<br>(day/month/year)                 |  | 18.10.2005                                   |
| Applicant's or agent's file reference<br>K 62 414/6 |  | <b>IMPORTANT NOTIFICATION</b>                |
| International application No.<br>PCT/EP2004/007589  | International filing date (day/month/year)<br>09.07.2004 | Priority date (day/month/year)<br>11.07.2003 |
| Applicant<br>W.L. GORE & ASSOCIATES GMBH et al.     |  |  |

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The Applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purpose of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purpose of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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# PATENT COOPERATION TREATY



## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

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| Applicant's or agent's file reference<br>K 62 414/6                                      | <b>FOR FURTHER ACTION</b>                                | See Form PCT/IPEA/416                        |
| International application No.<br>PCT/EP2004/007589                                       | International filing date (day/month/year)<br>09.07.2004 | Priority date (day/month/year)<br>11.07.2003 |
| International Patent Classification (IPC) or national classification and IPC<br>H01B7/08 |  |  |
| Applicant<br>W.L. GORE & ASSOCIATES GMBH et al.  |  |  |

|    |   |
|----|---|
| 1. | This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.   |
| 2. | This REPORT consists of a total of 5 sheets, including this cover sheet.  |
| 3. | <p>This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of 5 sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> |
| 4. | <p>This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement according to Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>   |

|   |  |
|---|--|
| Date of submission of the demand<br>10.05.2005  | Date of completion of this report<br>18.10.2005  |
| Name and mailing address of the IPEA<br> European Patent Office - P.B. 5818 Patentlaan 2<br>NL-2280 HV Rijswijk - Netherlands<br>Tel.: +31 70 340-2040 Tx: 31 651 epo nl<br>Fax: +31 70 340-3016 | Authorized officer<br>Salm, R<br>Tel. +31 70 340-2692<br> |

10/564301

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/EP2004/007589

IAP20 PCT/EP2004/007589 10 JAN 2006

## Box No. I. Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b)).
  - ☐ publication of the international application (under Rule 12.4).
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3).
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

## Description, pages

1-24 as originally filed

## Claims, No.

1-20 received on 10.05.2005 with the letter of 10.05.2005

## Drawings, sheets

1/12-12/12 as originally filed

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☒ the claims, No. 21
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)):
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

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| International application No.<br>PCT/EP2004/007589 |
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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

|                               |      |        |      |
|-------------------------------|------|--------|------|
| Novelty (N)                   | Yes: | Claims | 1-20 |
|                               | No:  | Claims |      |
| Inventive Step (IS)           | Yes: | Claims | 1-20 |
|                               | No:  | Claims |      |
| Industrial Applicability (IA) | Yes: | Claims | 1-20 |
|                               | No:  | Claims |      |

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**2. Citations and explanations (Rule 70.7)**

**see Supplementary sheet**

**Re item V.**

- 1 In the present communication, reference is made to the following documents:

D1: US 4 382 236 A (SUZUKI HIROSUKI) May 3, 1983 (1983-05-03)

2 INDEPENDENT CLAIM 1

Document D1 is regarded as the closest prior art. It discloses (the references in parentheses relate to this document):

a ribbon cable, having two conductor planes each with a plurality of electrical conductors (2a, 2a') running in the longitudinal direction of the ribbon, which are kept at a defined distance from one another in the direction of the ribbon cable thickness and/or in the direction of the ribbon cable width by means of a central insulating layer (1) of a predetermined thickness, and are electrically insulated and positioned in relation to the respective outer side of the ribbon cable by means of a respective outer insulating layer (3), wherein such a selection of material for the central insulating layer (1) and the outer insulating layers (3) is made that the outer insulating layer has a greater hardness than the central insulating layer

from which the subject matter of the independent claim 1 differs in that:  
the central insulating layer has a greater hardness than the outer insulating layer.  
The subject matter of claim 1 is consequently novel (Article 33 (2) PCT).

The object to be achieved by the present invention can consequently be seen as that of  
permitting a high degree of accuracy of the impedance, while great flexibility is also achieved.

The solution proposed for this object in claim 1 of the present application is based on an inventive step (Article 33 (3) PCT) because no suggestion of this solution is found in the prior art.

3 INDEPENDENT CLAIM 17

Similar argumentation as for claim 1 also applies to claim 17, which discloses a method for producing a ribbon cable according to claim 1.

**4 DEPENDENT CLAIMS**

Claims 2-16 are dependent on claim 1 and consequently likewise meet the requirements of the PCT with respect to novelty and inventive step.

Claims 18-20 are dependent on claim 17 and consequently likewise meet the requirements of the PCT with respect to novelty and inventive step.

**5 INDUSTRIAL APPLICABILITY**

The application relates to a ribbon cable for data transmission; therefore, the requirements of Article 33 (4) PCT with respect to industrial applicability are met.

1. Ribbon cable, having at least two conductor planes each with a plurality of electrical conductors (13a to 19b; 113a to 117c; 213a to 217c) running in the longitudinal direction of the ribbon, which are kept at a defined distance from one another in the direction of the ribbon cable thickness and/or in the direction of the ribbon cable width by means of a central insulating layer (21; 121; 221) of a predetermined thickness, and are electrically insulated and positioned in relation to the respective outer side of the ribbon cable by means of a respective outer insulating layer (23a, 23b; 123a, 123b; 223a, 223b), wherein such a selection of material for the central insulating layer (21; 121; 221) and the outer insulating layers (23a, 23b; 123a, 123b; 223a, 223b) is made that the material of the central insulating layer has a greater hardness than the material of the outer insulating layers, in such a way that, when an increasing compressive force acting in the direction of the ribbon cable thickness is exerted on the ribbon cable by the electrical conductors (13a to 19b; 113a to 117c; 213a to 217c), the material of the outer insulating layers is displaced much more readily than the material of the central insulating layer.
2. Ribbon cable according to Claim 1, in which at least some of the electrical conductors (13a to 19b; 113a, 113b, 115a, 115b, 117a, 117b) are formed by round conductors.
3. Ribbon cable according to Claim 1 or 2, in which at least some of the electrical conductors are formed by flat conductors (113c, 115c, 117c; 213a to 217c).

4. Ribbon cable according to Claim 2 or 3, in which some of the flat conductors are formed as narrow conductors (113a, 113b, 115a, 115b, 117a, 117b; 213a, 213b, 215a, 215b, 217a, 217b) and the rest are formed as wide flat conductors (113c, 115c, 117c; 213c, 215c, 217c).
5. Ribbon cable according to Claim 4, in which the narrow conductors form pairs of conductors (113a and 113b, 115a and 115b, 117a and 117b; 213a and 213b, 215a and 215b, 217a and 217b), each with two adjacent narrow conductors.
6. Ribbon cable according to Claim 5, in which each of the pairs of conductors comprising narrow flat conductors (113a and 113b, 115a and 115b, 117a and 117b; 213a and 213b, 215a and 215b, 217a and 217b) in one of the conductor planes is assigned a wide flat conductor (113c, 115c, 117c; 213c, 215c, 217c) of the other conductor plane, the wide flat conductors (113c, 115c, 117c; 213c, 215c, 217c) each having such a width and position that each of them extends widthwise over the entire width of a respectively opposite pair of conductors (113a and 113b, 115a and 115b, 117a and 117b; 213a and 213b, 215a and 215b, 217a and 217b) of the other conductor plane.
7. Ribbon cable according to Claim 6, in which the wide flat conductors (113c, 115c, 117c; 213c, 215c, 217c) are arranged in the one conductor plane and the narrow conductors (113a, 113b, 115a, 115b, 117a, 117b; 213a, 213b, 215a, 215b, 217a, 217b) are arranged in the other conductor plane.
8. Ribbon cable according to Claim 6 or 7, in which at least some of the narrow conductors (113a, 113b,

115a, 115b, 117a, 117b) are formed by round conductors.

- 5 9. Ribbon cable according to one of Claims 6 to 8, in which at least some of the narrow conductors (213a, 213b, 215a, 215b, 217a, 217b) are formed by flat conductors.
- 10 10. Ribbon cable according to one of Claims 1 to 9, the central insulating layer (21; 121; 221) and/or outer insulating layers (23a, 23b; 123a, 123b; 223a, 223b) of which are made of PTFE.
- 15 11. Ribbon cable according to Claim 10, the central insulating layer (21; 121; 221) and/or outer insulating layers (23a, 23b; 123a, 123b; 223a, 223b) of which are made of ePTFE.
- 20 12. Ribbon cable according to one of Claims 4 to 11, in which wide flat conductors (113c, 115c, 117c; 213c, 215c, 217c) that are mutually adjacent in the direction of the ribbon cable width, or adjacent groups of flat conductors, are arranged alternately in the one conductor plane and in the other conductor plane, with correspondingly alternating arrangement of the respectively associated narrow conductors (113a, 113b, 115a, 115b, 117a, 117b; 213a, 213b, 215a, 215b, 217a, 217b) in the one or the other conductor plane, respectively.
- 25 30 13. Use of the ribbon cable (11; 111; 211) according to one of Claims 1 to 12 for differential data transmission, in which one of two mutually adjacent electrical conductors (13a to 19b; 113a, 113b, 115a, 115b, 117a, 117b; 213a, 213b, 215a, 215b, 217a, 217b) forming a pair of signal conductors (for example 13a, 13b; 113a, 113b; 213a, 213b) respectively transmits data pulses in non-negated
- 35

signal form and the other transmits the data pulses in negated signal form.

- 5 14. Use according to Claim 13, at least some of the pairs of signal conductors (for example 13a, 13b) being formed by two adjacent electrical conductors belonging to different conductor planes.
- 10 15. Use according to Claim 13 or 14, at least some of the pairs of signal conductors (for example 113a, 113b; 213a, 213b) being formed by two adjacent electrical conductors belonging to the same conductor plane.
- 15 16. Use of the ribbon cable according to one of Claims 6 to 12 for differential data transmission, in which one of two mutually adjacent narrow conductors of the one conductor plane forming a pair of signal conductors (for example 113a, 113b; 20 213a, 213b) respectively transmits data pulses in non-negated signal form and the other transmits the data pulses in negated signal form, and a wide flat conductor (for example 113c; 213c) of the other conductor plane, spanning the respective pair of signal conductors (for example 113a, 113b; 213a, 213b), is used as a reference potential conductor for the respectively associated pair of signal conductors (for example 113a, 113b; 213a, 213b).
- 25 17. Method for producing a ribbon cable with two conductor planes each with a plurality of electrical conductors running in the longitudinal direction of the ribbon, which are kept at a defined distance from one another in the direction of the ribbon cable thickness by means of a central insulating layer of a predetermined thickness, and are electrically insulated and positioned with respect to one another and in relation to the
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respective outer side of the ribbon cable by means of a respective outer insulating layer, with the following production steps:

- 5 (a) a roller arrangement is provided, with two rotatably held rollers arranged parallel to one another, each of which has on its outer circumference a plurality of annular grooves spaced axially apart from one other for each receiving an electrical conductor in a guiding manner;
- 10 (b) the two rollers are set to such a radial distance from one another as to produce between them a gap with a gap thickness which is less than the sum of the thicknesses of the central insulating layer and the two outer insulating layers by a predetermined amount;
- 15 (c) on an input side of the gap, supply stores for the delivery of components of the ribbon cable in the form of the electrical conductors, outer insulating layers in strip form and a central insulating layer in strip form are positioned in relation to the roller arrangement in such a way that, following one over the other as seen in the direction of the gap thickness, the one outer insulating layer, the electrical
- 20 conductors of the one conductor plane, the central insulating layer, the electrical conductors of the other conductor plane and, finally, the other outer insulating layer enter the gap;
- 25 (d) by means of the rollers, such a predetermined contact pressure is exerted on the components of the ribbon cable introduced into the gap that the components of the ribbon cable are joined together to form the ribbon cable;
- 30 (e) such a selection of material for the central insulating layer and the outer insulating layers is made that the material of the central
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5 insulating layer has a greater hardness than  
the material of the outer insulating layers, in  
such a way that, with the predetermined contact  
pressure by the electrical conductors,  
essentially only material of the outer  
insulating layers but not material of the  
central insulating layer is displaced, and  
consequently the thickness of the central  
insulating layer is maintained essentially  
10 unchanged.

18. Method according to Claim 17, in which the  
insulating layers are adhesively bonded to one  
another as they pass through the gap.
- 15 19. Method according to Claim 18, in which the adhesive  
bonding is brought about by adhesive applied to the  
insulating layers.
- 20 20. Method according to Claim 18, in which at least one  
of the rollers is heated and the adhesive bonding  
is brought about by incipient melting of the  
insulating layers during their contact with the  
rollers.